8 CHANNEL FAST TIMING POD

PM8825

9450 088 25001

Instruction manual

9499 503 01011

821014

S&i

Scientific & Industrial equipment division

PHILIPS

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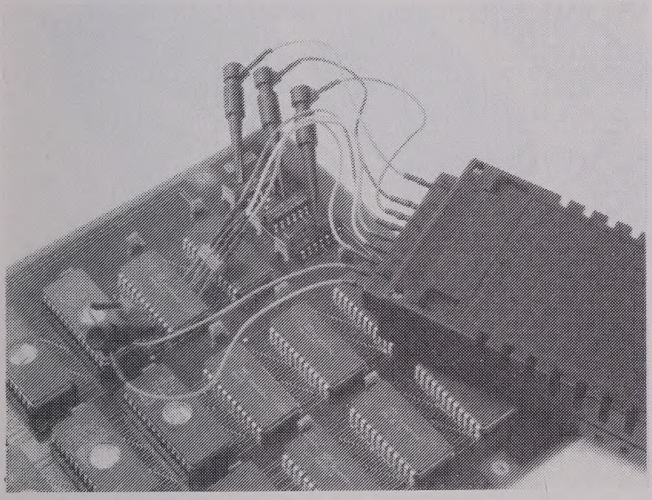

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1. INTRODUCTION

1.1. LOGIC POD PM 8825

The PM 8825 is a universal 8-bit logic probe intended to be usedwith logic analyzers. It contains 8 identical level detectors with a common wide range threshold, high input impedance and symmetrical ECL compatible outputs. Power is derived from the logic analyzer the pod is being used with.

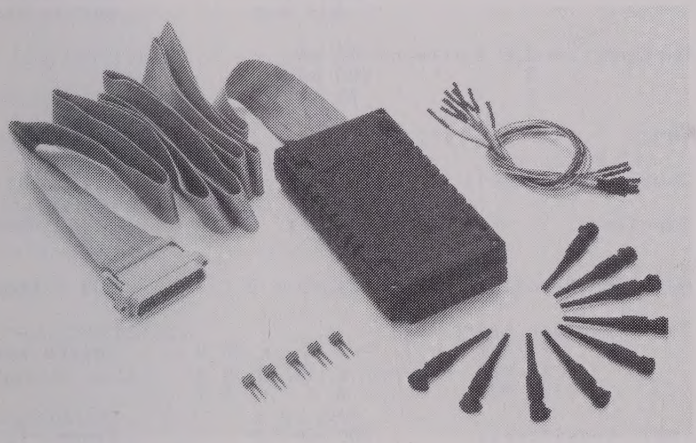


FIG. 1. PM 8825

1.2. GENERAL

Unless otherwise stated the following data applies to the PM 8825 excluding the possible side effects of the logic analyzer the PM 8825 is used with.

The data and tolerances stated in numerical values are guaranteed by the manufacturer. Values without tolerances are typical and represent the characteristics of an average unit.

All data are valid only after a 15 minute warm-up period.

2. CHARACTERISTICS

2.1. ELECTRICAL

designation		specification	additional information
POWER			
Voltage		+ 2.6 V - 5 V - 6 V	To be supplied by the instrument the pod is used with
Current	+ 2,6 V	70 mA	
	- 5 V	400 mA	
	- 6 V	80 mA	
INPUT			
Number of channels		8	All identical
Impedance	Rp	1 Mohm	Test leads excluded
	Cp	5 pF	
Max. input voltage		+/- 50 V D.C.	200 V transient
Input voltage range			
	25 MHz	- 6 ... + 20 V	Square wave signals
	50 MHz	- 6 ... + 6 V	
	300 MHz	- 6 ... + 6 V	
Input sensitivety		400 mV P-P	Symmetrical around threshold level
Min. pulswidth		3 ns	

designation	specification	additional information
OUTPUT		
Logic E.C.L.	Symmetrical	2 wires each channel
Fan out	10	
Undershoot	Max. 10% of P-P value see FIG. 2.	Measured at the end of the cable
Probe availability	1 indication wire	Connected to ground
THRESHOLD		
Threshold range	- 3 V ... + 12 V +/- 5 %	On probe tip
Relation between supplied and real threshold level	-(5.1 + threshold)/2	
Impedance	1 Mohm	On threshold wire
A.C. CHARACTERISTICS		
Propagation delay	11 +/- 1 ns	
Puls narrowing	1 ns max.	
Skew between channels channels 0-1-2-3 channels 4-5-6-7 other combinations	 0.5 ns max. 0.5 ns max. 1 ns max.	 2 ns for 2 different probes

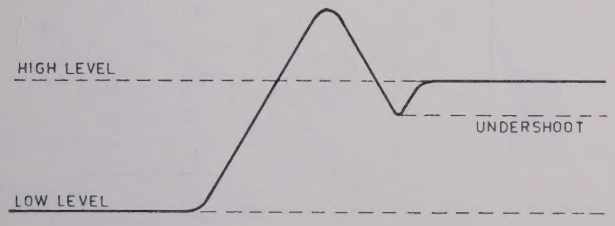


FIG. 2. Undershoot

2.4. ENVIRONMENTAL

These characteristics are valid only if the instrument is checked in accordance with the official checking procedure. Details of these procedures and failure criteria are supplied on request by the PHILIPS organisation in your country, or by N.V. PHILIPS GLOEILAMPENFABRIEKEN, TEST AND MEASURING DEPARTMENT EINDHOVEN THE NETHERLANDS.

designation	specification	additional information
AMBIENT TEMPERATURE		
Rated range of use	+ 5°C ... +40°C	Test procedure conforming to IEC 68, Ab & Bb
Limited range of operation	-10°C ... +55°C	
Storage and transport conditions	-40°C ... +70°C	
Recovery time	1 hour	If the temperatuur of the pod is raised from -40 ... +20°C at 60% rel. humidity
HUMIDITY	probe withstands 21 cycles of damp heat test: temp. 25°C to 45°C rel. humidity 90% to 100% cycle duration 24 hours	Test procedure conforming to IEC 68 Db
ALTITUDE		
limited range of operation	5000 m	47,5 kPa
limited range of transport	15000 m	10 kPa
BUMP	Probe withstands pumps of 100 m/s 1/2 sine, 6 ms duration, in each of 3 directions	In accordance with IEC 68 Fc
VIBRATION	Probe withstands in each of 3 directions 30 minutes vibration of 10 Hz to 150 Hz, 0,7 mm peak to peak amplitude Acceleration limited to 50m/s^2 at higher frequencies	In accordance with IEC 68 Fc

3. CIRCUITRY

3.1. DESCRIPTION

The drawing of the complete schematic is given in FIG. 4. It contains 8 identical channels. Only one channel (0) will be discussed.

Each channel can be split in to three parts
- a. High impedance attenuator
- b. Impedance converter
- c. The comparator

these three parts will be discussed separately

a. High impedance attenuator

This part consists of the resistors R42 and R34 and capacitors C19 and Cx, were Cx equals the input capacity of the impedance converter. It attenuates 3 times. In order to get an independent attenuation of the whole frequency range, the relationship between these parts must be: R42 * C19 = R34 * Cx.

VTH at the lower end of R34 is the setting for the input threshold voltage. It transfers the input voltage on a level that equals the reference voltage of the comparator. For overvoltage protection of the input V19 is added. Negative overvoltage wil be determinated by V19 and R42, positive overvoltages by the upper V16 and R42.

b. Impedance converter

The impedance converter consists of two matched FET's V16 and a transistor V17. A current source (lower V16 and R44) sets the current through the matched FET's. To be sure of good H.F. transfer the emittor follower V17 is added. The H.F. component of the signal will be directly given from the source of V16 via the emittor follower V17 to the comparator. The L.F. component will be transferred via resistor R36. The FET's are matched on such a way that:

1. With R44 = 100 ohm the current must lay between 4 and 5 mA
2. The difference between Vgs is as little as posible 5 mV

c. The comparator

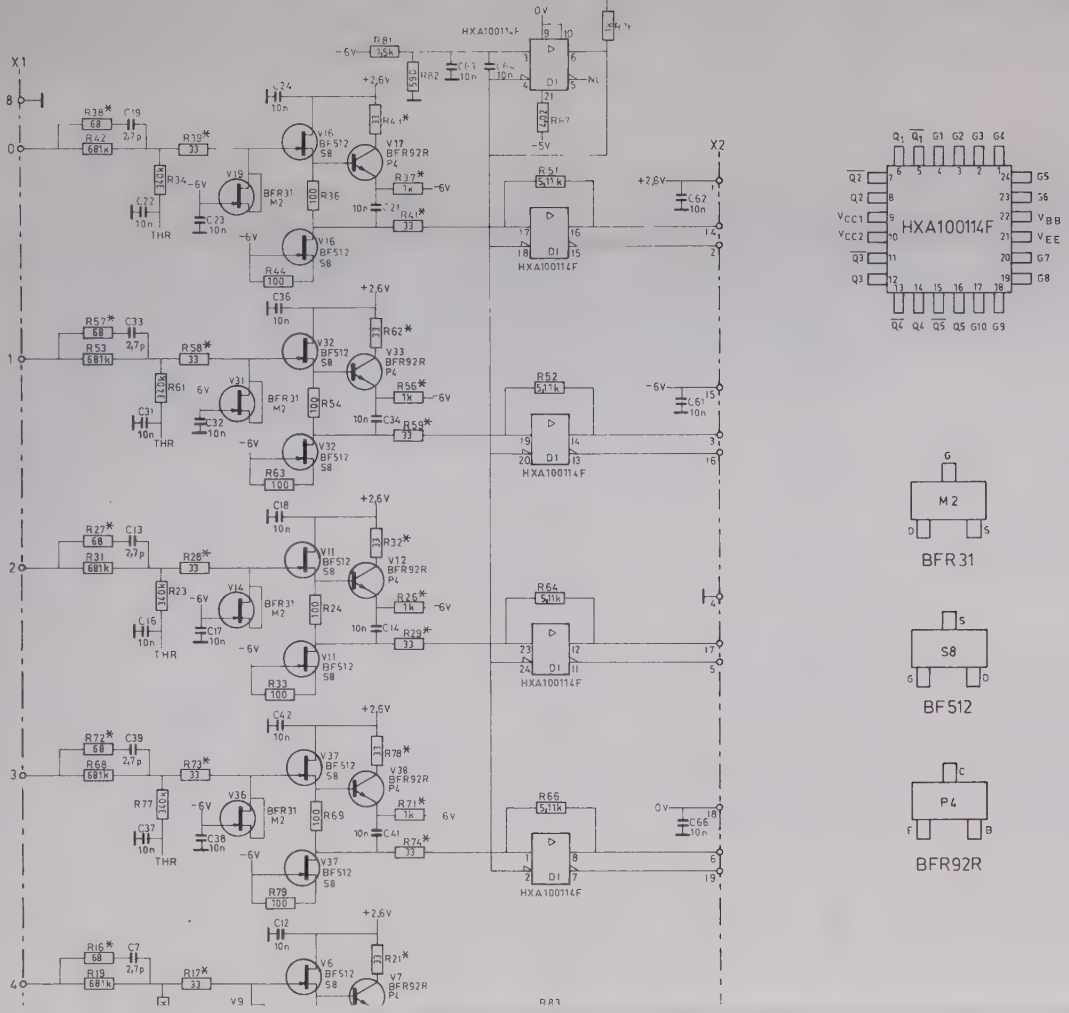
The heart of a logic probe is the comparator. It must make the decision if a signal is higher or lower than the reference voltage. In principle the comparator is a differential amplifier who's output in this case is fitted for logical signals i.e. for E.C.L. For the comparator a quintiple differential line receiver (HXA 100114F) is used. It contains 5 amplifiers with a gain of 30 X. Herewith, comparators are built that give E.C.L. output signals with an input swing of 30 mV around threshold level. There are 8 channels so there must be 8 comparators. This is done by using two HXA 100114F chips.

The inputs of these chips have an offset voltage, this voltage must be cancelled out when using the chip as a comparator. Presuming that all offset voltages of one chip are the same, the 5th amplifier is switched as a voltage follower and its offset voltage is set in series with the reference voltage of 4 channels. In this way the offset voltage is added to the reference voltage and the voltage follower will neutralize the offset. The capacitor C64, between the inputs, is to avoid oscillations.

The reference voltage is set by R81 and R82. The reference voltage should be -1.3 V (E.C.L. level). To avoid crosstalk between channels -1.7 V is chosen. This is done so that an open input does not approache the critical E.C.L. level -1.3 V. For measuring E.C.L. levels, the threshold voltage is set to -1.9 V using the formula :

THR = -(5.1 + threshold)/2 = -(5.1 + (- 1.3))/2 = -1.9 V.

In this way the input of an unused channel is 0.2 V out of balance and the output cannot switch between high and low, thus avoiding crosstalk. In order to make the comparator independent of hazards, a hysteresis is built in by adding a feedback resistor R 51.


X1
X2
HXA100114F
BFR31
BF512
BFR92R

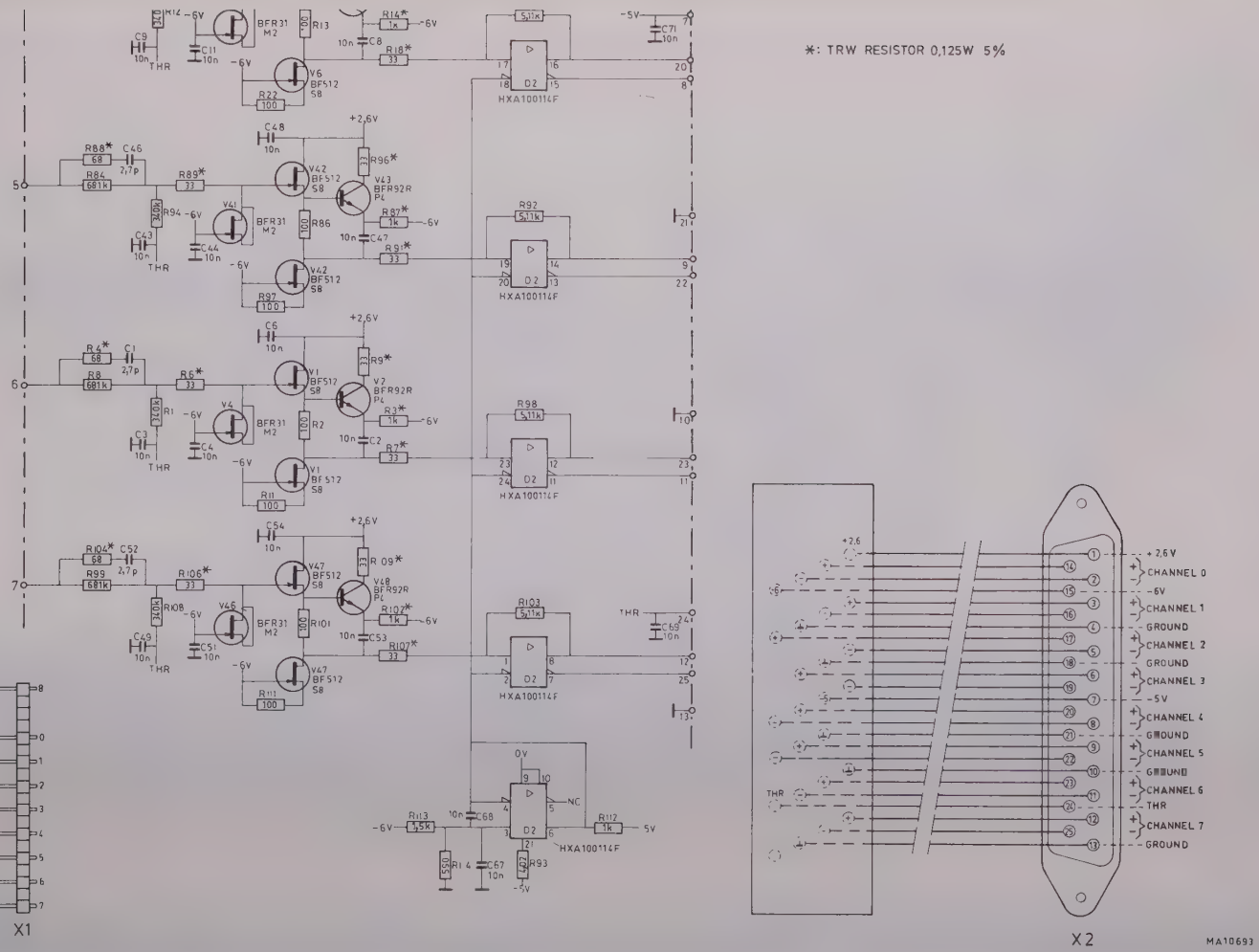
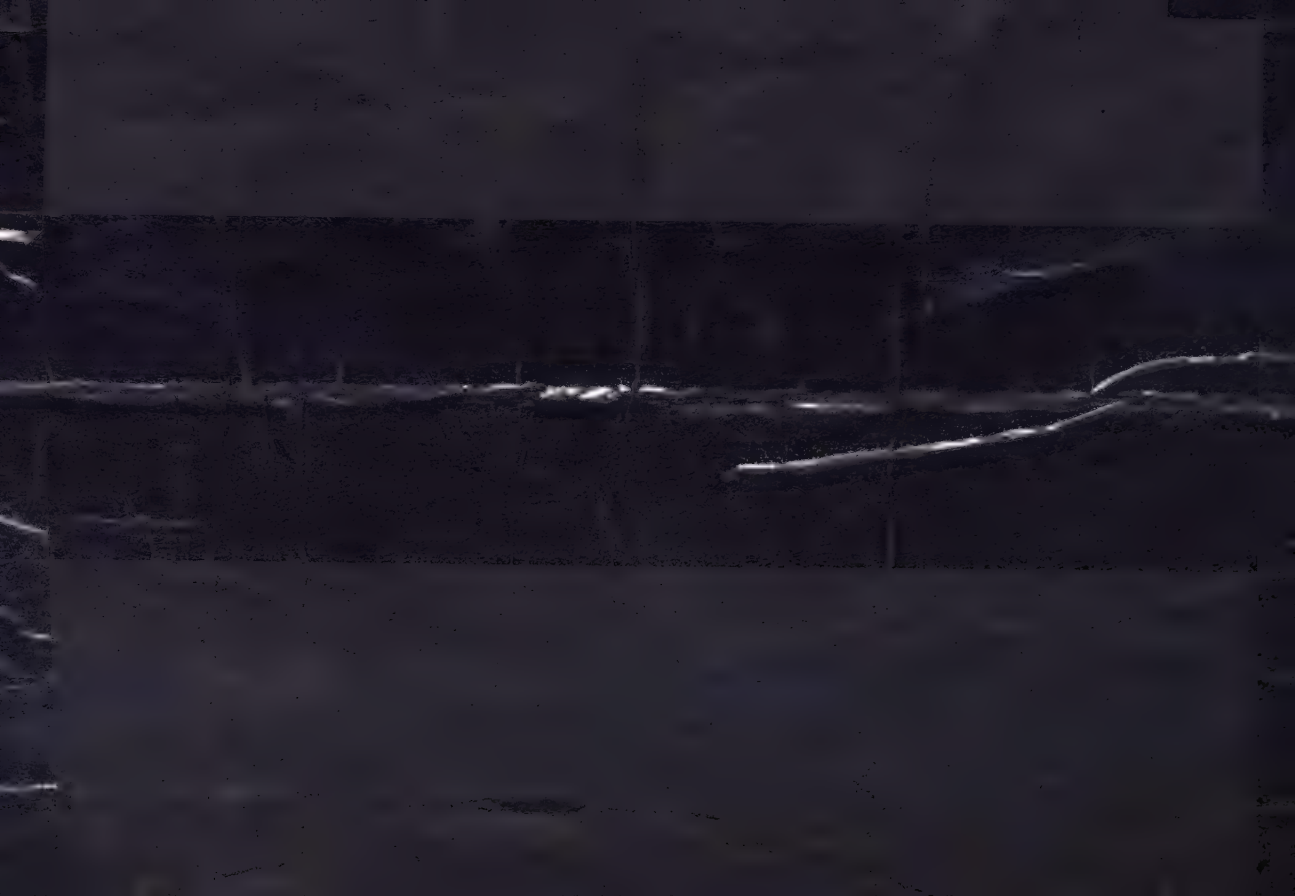
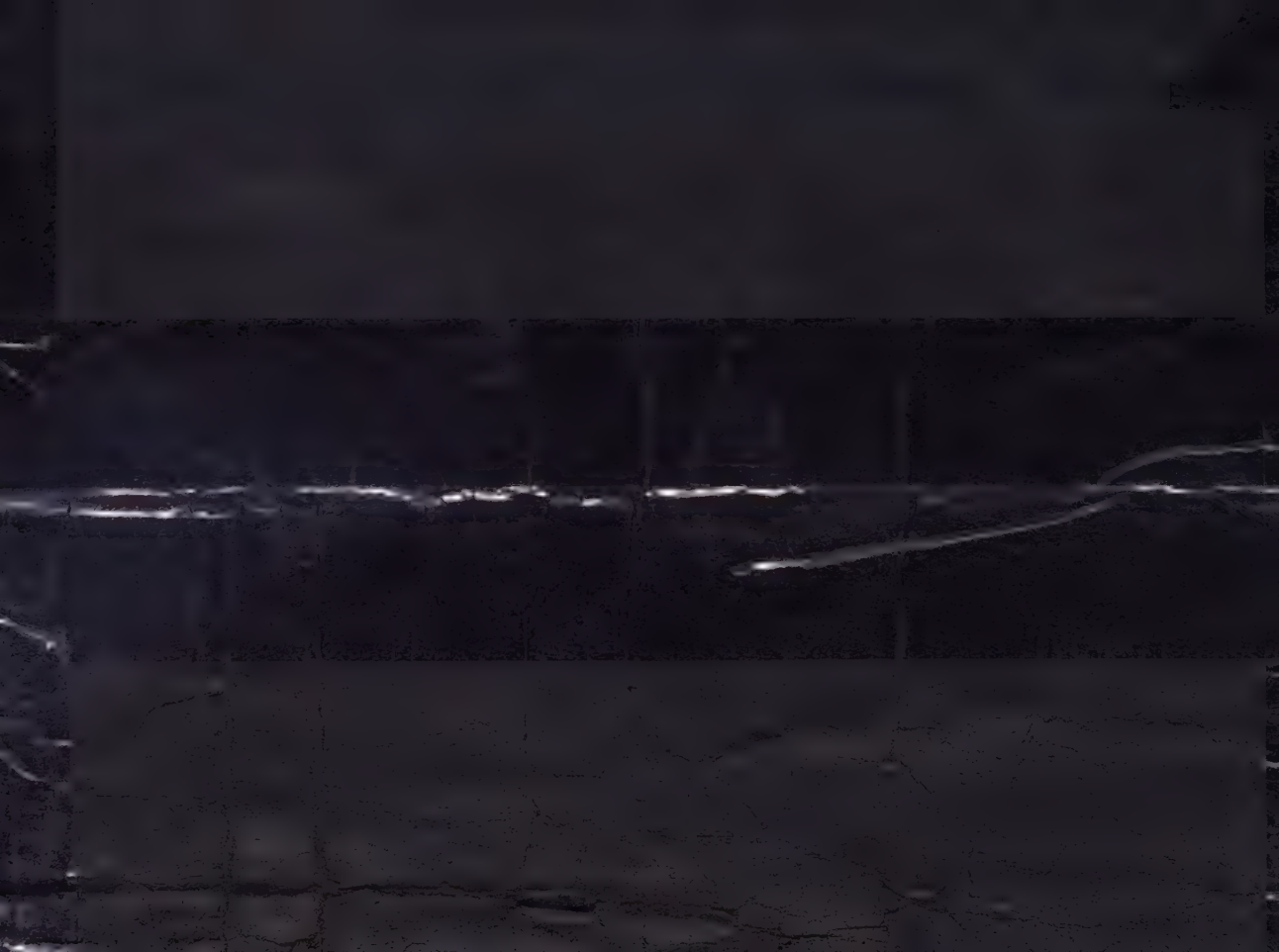


FIG.4. CIRCUIT DIAGRAM OF THE PM 8825





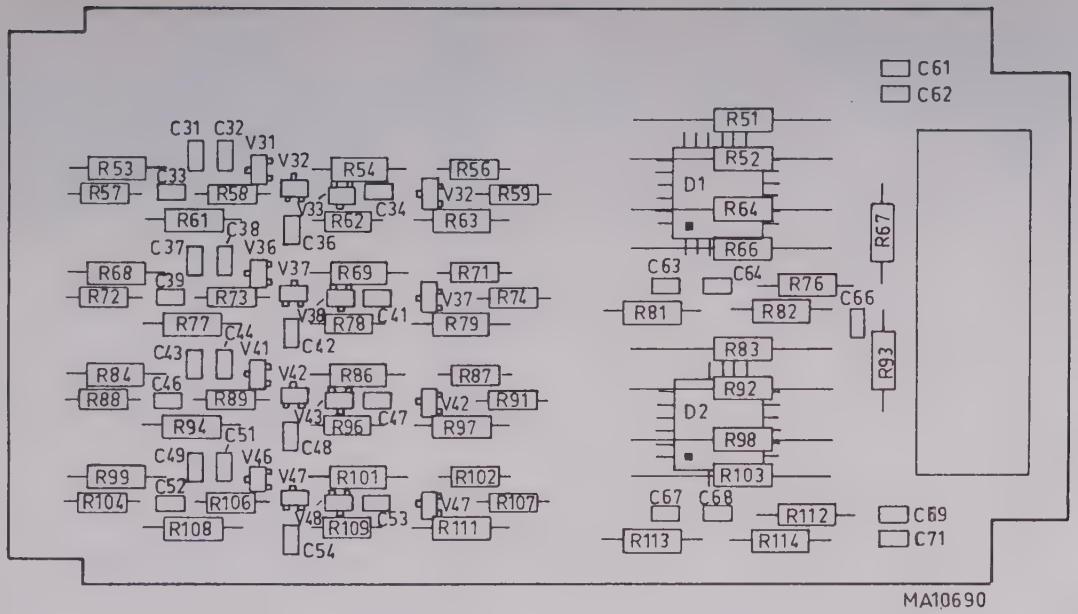


FIG.5. P.C. BOARD OF UNIT 1

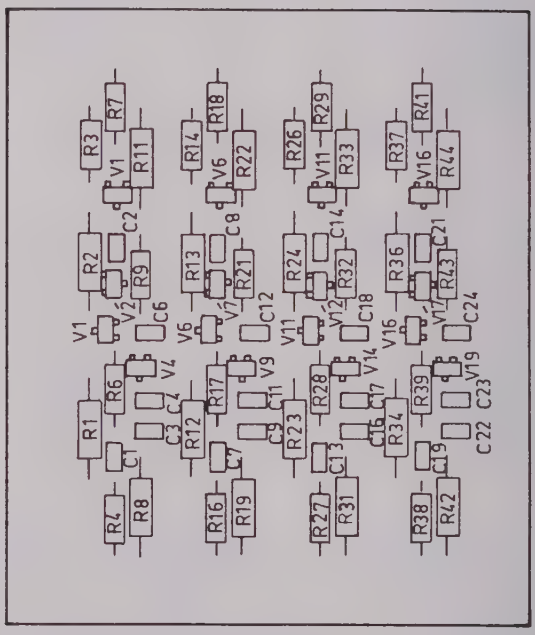


FIG.6. P.C. BOARD OF UNIT 2

4. PART LIST

4.1. PARTS OF UNIT 1.

Type	value	quantity	ordering number
CAPACITORS			
CER. CHIP CAP. 100 V +/- 0.5 pF	2E7	4	5322 122 31873
CER. CHIP CAP. 50 V 20 %	10NF	16	5322 122 34098
CER. CAP. 2 40 V -20 +80 %	10NF	9	4822 122 30043
RESISTORS			
TRW RST. 0.125 W 5 %	33E	12	5322 116 64098
TRW RST. 0.125 W 5 %	68E	4	5322 116 64054
TRW RST. 0.125 W 5 %	1K	4	4822 116 51123
MTL. FILM RST. MR25 1 %	4E02	2	5322 116 55617
MTL. FILM RST. MR25 0.5 %	100E	8	5322 116 55549
MTL. FILM RST. MR25 0.5 %	590E	2	4822 116 50561
MTL. FILM RST. MR25 1 %	1K	2	4822 116 51235
MTL. FILM RST. MR25 0.5 %	1K5	2	4822 116 51239
MTL. FILM RST. MR25 1 %	5K11	8	5322 116 54595
MTL. FILM RST. MR25 0.5 %	340K	4	5322 116 51658
MTL. FILM RST. MR25 0.5 %	681K	4	5322 116 55284
SEMICONDUCTORS			
INT. CIRCUIT HXA	100114F	2	5322 209 81492
FET	BFR 33 (M2)	4	5322 130 44787
H.F. TRANSISTOR	BF 512 (S8)	8	5322 130 44875
H.F. TRANSISTOR	BFR 92R (P4)	4	5322 130 44606

4.2. PARTS OF UNIT 2.

Type	value	quantity	ordering number
CAPACITORS			
CER. CHIP CAP. 100 V +/- 0.5 pF	2E7	4	5322 122 31873
CER. CHIP CAP. 50 V 20 %	10NF	16	5322 122 34098
RESISTORS			
TRW RST. 0.125 W 5 %	33E	12	5322 116 64098
TRW RST. 0.125 W 5 %	68E	4	5322 116 64054
TRW RST. 0.125 W 5 %	1K	4	4822 116 51123
MTL. FILM RST. MR25 0.5 %	100E	8	5322 116 55549
MTL. FILM RST. MR25 0.5 %	340K	4	5322 116 51658
MTL. FILM RST. MR25 0.5 %	681K	4	5322 116 55284
SEMICONDUCTORS			
FET	BFR 33 (M2)	4	5322 130 44787
H.F. TRANSISTOR	BF 512 (S8)	8	5322 130 44875
H.F. TRANSISTOR	BFR 92R (P4)	4	5322 130 44606

4.3. MECHANICAL PARTS

Type	value	quantity	ordering number
Cabinet top		1	5322 447 90298
Cabinet bottom		1	5322 447 90297
Flat cable	25 wires 1.5 mm	length 1.5 m	5322 323 50068
Probe input socket	9 pins	1	5322 265 40221
Probe output socket	25 pins	1	5322 264 61001
Cable/board socket	25 pins	1	5322 265 51031
Cil. screw	ST. CR. M2 X 16	4	4822 502 11177
Nut	ST. ZN. M2	4	4822 505 10323

CODING SYSTEM OF FAILURE REPORTING FOR QUALITY ASSESSMENT OF T & M INSTRUMENTS

(excl. potentiometric recorders)

The information contents of the coded failure description is necessary for our computerized processing of quality data.

Since the reporting of repair and maintenance routines must be complete and exact, we give you an example of a correctly filled-out PHILIPS SERVICE Job sheet.

① Country	② Day Month Year	③ Typenumber /Version	④ Factory/Serial no.
32	150475	OPM3260/02	DO007833

CODED FAILURE DESCRIPTION ⑥

⑤ Nature of call	Location	Component/sequence no.	Category
☐ Installation		TS0607	5
☐ Pre sale repair		R00631	2
☐ Preventive maintenance	0021	990001	4
☒ Corrective maintenance			
☐ Other			

⑦ *Job completed* ☒

Working time ⑧ 12 Hrs

Detailed description of the information to be entered in the various boxes:

①Country: 32 = Switzerland

②Day Month Year 150475 = 15 April 1975

③Type number/Version OPM3260/02 = Oscilloscope PM 3260, version 02 (in later oscilloscopes this number is placed in front of the serial no)

④Factory/Serial number DO0078 3 = DO 783 These data are mentioned on the type plate of the instrument

⑤ Nature of call: Enter a cross in the relevant box

⑥ Coded failure description

Location

☐☐☐☐

These four boxes are used to isolate the problem area. Write the code of the part in which the fault occurs, e.g. unit no or mechanical item no of this part (refer to 'PARTS LISTS' in the manual).

Example: 0001 for Unit 1
000A for Unit A
0075 for item 75

If units are not numbered, do not fill in the four boxes; see Example Job sheet.

Component/sequence no.

☐☐☐☐☐☐

These six boxes are intended to pinpoint the faulty component.

A. Enter the component designation as used in the circuit diagram. If the designation is alfa-numeric, the letters must be written (starting from the left) in the two left-hand boxes and the figures must be written (in such a way that the last digit occupies the right-most box) in the four right-hand boxes.

B. Parts not identified in the circuit diagram:

990000 Unknown/Not applicable
990001 Cabinet or rack (text plate, emblem, grip, rail, graticule, etc.)
990002 Knob (incl. dial knob, cap, etc.)
990003 Probe (only if attached to instrument)
990004 Leads and associated plugs
990005 Holder (valve, transistor, fuse, board, etc.)
990006 Complete unit (p.w. board, h.t. unit, etc.)
990007 Accessory (only those without type number)
990008 Documentation (manual, supplement, etc.)
990009 Foreign object
990099 Miscellaneous

Category

☐

0 Unknown, not applicable (fault not present, intermittent or disappeared)
1 Software error
2 Readjustment
3 Electrical repair (wiring, solder joint, etc.)
4 Mechanical repair (polishing, filing, remachining, etc.)
5 Replacement (of transistor, resistor, etc.)
6 Cleaning and/or lubrication
7 Operator error
8 Missing items (on pre-sale test)
9 Environmental requirements are not met

⑦ Job completed: Enter a cross when the job has been completed.

⑧ Working time: Enter the total number of working hours spent in connection with the job (excluding travelling, waiting time, etc.), using the last box for tenths of hours.

12 = 1,2 working hours (1 h 12 min.)

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Allmendstrasse 140, Postfach, CH-8027 Zürich;
tel. (1) 4882211/4882629

Singapore: Philips Singapore Private Ltd.,
Lorong 1, Toa Payoh, 1st floor,
P.O. Box 340, Toa Payoh Central Post Office,
Singapore 1231; tel. (2) 538811
Service Centre:
403 Delta House, 4th floor,
No. 2 Alexandra Road,
Singapore 0315; tel. 2712555

South Africa: South African Philips (Pty) Ltd.,
2 Herb Street, New Doornfontein, P.O.B. 7703,
Johannesburg 2000; tel. (11) 6140411

South-Korea: Philips Electronics (Korea) Ltd.,
P.O. Box 3680, Seoul; tel. 794 4202

Suomi: Oy Philips Ab.,
Kaivokatu 8,
P.O. Box 10255,
00101 Helsinki 10; tel. 17271
Service Centre:
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tel. (0) 523122

Sverige: Svenska A.B. Philips,
Philips Industrielektronik, Lidingövägen 50,
Fack, S11584 Stockholm; tel. (8) 635000

Syria: Philips Moyen-Orient S.A., Rue Fardoss 79,
Immeuble Kassas and Sadate, B.P. 2442, Damas,
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Taiwan: Philips Taiwan Ltd.,
San Min Building, P.O. Box 22978, Taipei;
tel. (2) 5631717

Tanzania: Philips (Tanzania) Ltd.,
Box 20104, Dar es Salaam; tel. 29571/4

Thailand: Philips Electrical Co. of Thailand Ltd.,
283 Silom Road, P.O. Box 961, Bangkok 5;
tel. 233-6330/9

Tunisia: S.T.I.E.T., 32 bis, Rue Ben Ghedhahem,
Tunis; tel. 244268/243025

Türkiye: Türk Philips Ticaret A.S.,
Posta Kutusu 504, Beyoglu,
Istanbul 1; tel. 435910

United Arab Emirates: Philips Delegate Office,
P.O. Box 2567, Dubai; tel. 220641/220642

Uruguay: Industrias Philips del Uruguay S.A.,
Avda Uruguay 1287, Casilla de Correo 294,
Montevideo; tel. 915641/44

U.S.A.:
Philips Test and Measuring Instruments Inc.,
California, Garden Grove 92645
12882 Valley View Street, Suite 9;
tel. : (213) 594-8741/ (714) 898-5000
California, Milpitas 95035
489 Valley Way;
tel. (408) 946-6722
Florida, Orlanda 32805
750 S Orange Blossom Trail, Suite 206;
tel. (305) 422-8131
Georgia, Norcross 30071
7094 Peachtree Industrial Blvd., Suite 220;
tel. (404) 586-0238
Illinois, Elk Grove Village 60007
175 Scott Street;
tel. (312) 640-7860
Massachusetts, Woburn 01801
21 Olympia Avenue;
tel. (617) 935-3972
Minnesota, Minneapolis 55420
7801 Metro Parkway, Suite 109;
tel. (612) 854-2426
New Jersey, Mahwah 07430
85 McKee Drive;
tel. (201) 529-3800, Toll-free (800) 631-7172

Venezuela: Industrias Venezolanas Philips S.A.,
Apartado Aereo 1167, Caracas 107;
tel. (2) 393811/353533

Zaire: S.A.M.E./S.Z.A.R.L., B.P. 16636, Kinshasa,
tel. 31887/8

Zambia: Philips Electrical Zambia Ltd.,
Mwenbeshi Road, P.O.B. 31878, Lusaka;
tel. 218511/218701

Zimbabwe: Philips Electrical (PVT) Ltd.,
62, Umtali Road, P.O. Box 994, Beverley/Salisbury;
tel. 47211

For information on change of address:
N.V. Philips' Gloeilampenfabrieken,
Test and Measuring Instruments, Building TQ III-4,
5600 MD Eindhoven - The Netherlands

For countries not listed:
N.V. Philips' Gloeilampenfabrieken, S&I Export,
Test and Measuring Instruments , Building TQIII-3,
5600 MD Eindhoven - The Netherlands